User Guide

Fiber Optic Transceivers

FOX 3G HD-SDI

Multi-Rate HD-SDI / SDI Fiber Optic Transceiver

Extron® Electronics
INTERFACING, SWITCHING AND CONTROL

68-1384-01 Rev. B
07 10

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过 。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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Introduction

WARNING: The FOX 3G HD-SDI units output continuous invisible light, which may be harmful to the eyes; use with caution.

- ***Do not look*** into the rear panel fiber optic cable connectors or into the fiber optic cables themselves.
- Plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.

This section introduces this manual and the FOX 3G HD-SDI transceivers.

- About this Manual
- About the FOX 3G HD-SDI
- Features

About this Manual

This manual contains information about the following Extron® FOX fiber optic transceivers:

- **FOX 3G HD-SDI SM —** A singlemode, very long distance (up to 30 km [18.75 miles]) transceiver. See figure 1.
- **FOX 3G HD-SDI P SM —** A singlemode, very long distance (up to 30 km [18.75 miles]) transceiver that is *pathologically compliant*
- **FOX 3G HD-SDI MM —** A multimode, long distance (up to 2 km [6,561 feet]) transceiver

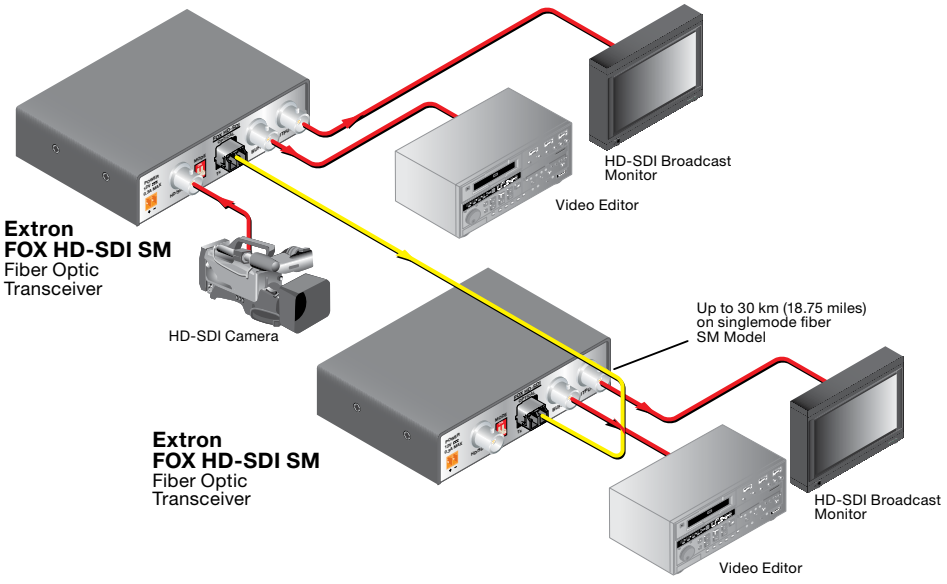


Figure 1. Typical FOX 3G HD-SDI Application

NOTE: The three products are physically and functionally identical, with the exception of the effective range of transmission and the compliance. In this manual, the term "FOX 3G HD-SDI" refers to any of the products.

About the FOX 3G HD-SDI

The Extron FOX 3G HD-SDI product family consists of three models (P SM, SM, and MM) of high performance digital (HD-SDI, SDI, or 3G-SDI) video fiber optic transceivers. The transmitted signal can include any audio or unidirectional serial data that is embedded in the input video.

NOTE: All transceivers in the system must be the same model (all singlemode, all singlemode pathologically compliant, or all multimode).

Transceiver Configurations

The transceiver can be configured via its rear panel Mode DIP switches to operate in one of three ways:

- **Bidirectional transceiver**
- **Transmitter**
- **Receiver**

NOTE: See **item ②**, "Mode switches," on page 6 to set the configuration.

Bidirectional transceiver

NOTES:
- In this manual, the term "transceiver" refers to any FOX 3G HD-SDI; the term "bidirectional transceiver" refers to a FOX 3G HD-SDI configured as described in this section.
- Although the description below does allow connection of a FOX 3G HD-SDI configured as transmitter or receiver, the typical configuration is as shown: two bidirectional transceivers.

A FOX 3G HD-SDI that is configured as a bidirectional transceiver (see figure 2) inputs digital video on its SDI/HD-SDI Input BNC. The transceiver converts the video input to a proprietary signal and transmits the video over a fiber link to another FOX 3G HD-SDI that is configured as either a bidirectional transceiver or a receiver.

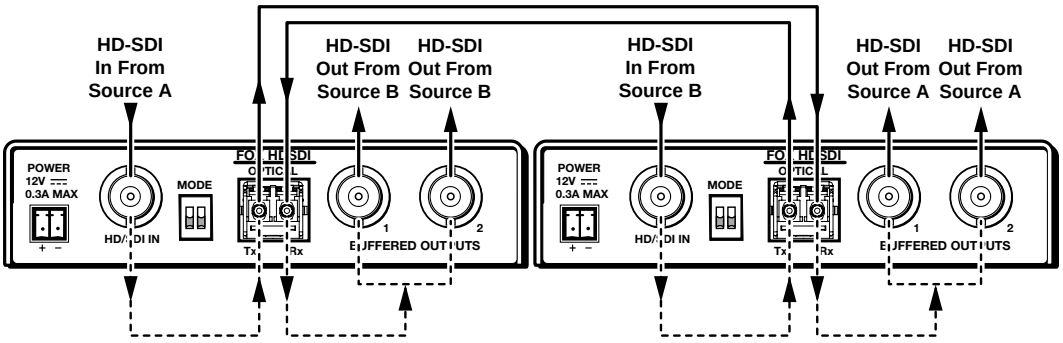


Figure 2. Bidirectional Transceiver Connections

A bidirectional transceiver can also simultaneously receive a proprietary signal from another transceiver (in any configuration) on its Optical Rx port, convert the proprietary signal back to the original format digital video, and output the video on its own two Buffered Outputs BNC connectors.

Transmitter and receiver

NOTE: Although the description below does allow connection of a FOX 3G HD-SDI configured as a bidirectional transceiver, the typical configuration is as shown: a transmitter and one or more receivers.

A FOX 3G HD-SDI that is configured as a transmitter (see figure 3) inputs digital video on its HD/SDI Input BNC. The transmitter converts the video input to a proprietary signal and transmits the video over a fiber link to a FOX 3G HD-SDI that is configured as either a receiver or a bidirectional transceiver. The transmitter also simultaneously outputs the digital video on its two Buffered Outputs BNCs.

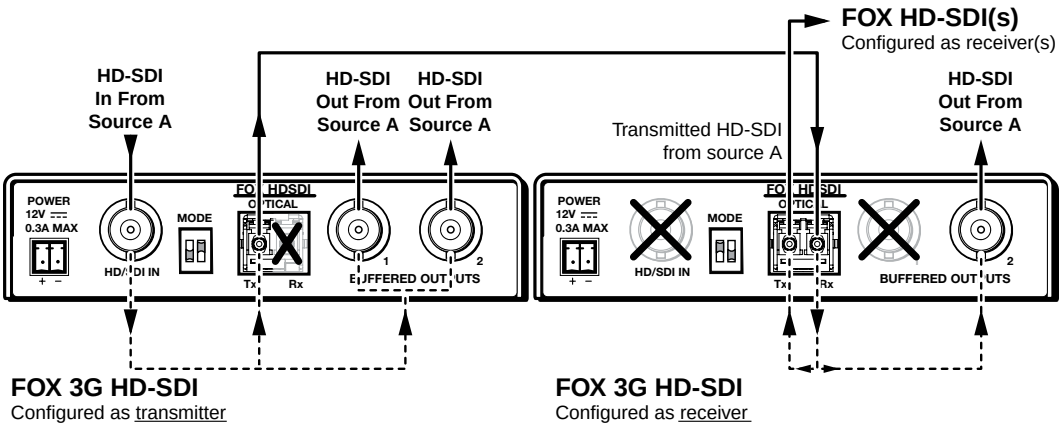


Figure 3. Transmitter-to-Receiver Connections

A FOX 3G HD-SDI that is configured as a receiver receives a proprietary signal on its Rx fiber optic port. The receiver converts the proprietary signal back to original HD-SDI, SDI, or 3G-SDI video and outputs the video on only one of its own Buffered Output BNC connectors, Output 2.

The receiver converts the second digital video signal that it created from the optical input back into a proprietary signal and outputs it on the Optical Tx port over a fiber link to another FOX 3G HD-SDI that is configured as a receiver or as a bidirectional transceiver.

NOTE: Up to 10 receivers can be daisy-chained in this manner.

Features

Fiber optic characteristics — The FOX 3G HD-SDI sends and receives digital optical signals via fiber optic small form factor pluggable (SFP) modules with LC-type connectors.

Extends HD-SDI, SDI, and 3G-SDI signals very long distances over a single fiber — The FOX 3G HD-SDI supports multi-rate SDI at rates up to 2.97 Gbps, and complies with SMPTE 259M-C, 292M, 424M, and ITU digital video standards.

(FOX 3G HD-SDI P SM only) Immunity to SDI and HD-SDI pathological signal patterns — The FOX 3G HD-SDI P SM model adds immunity to pathological signals, including test patterns defined by SMPTE RP 178 and SMPTE RP 198 for SD-SDI, HD-SDI and 3G-SDI

Video input — When it is configured as a transmitter, the FOX 3G HD-SDI inputs digital video on a BNC connector.

HD-SDI loop-through — The transceiver has two Buffered SDI/HD-SDI BNC connectors that allows connection of a local monitor when the transceiver is configured as a transmitter.

Video output — The transceiver outputs digital video on one or two Buffered SDI/HD-SDI BNC connectors when it is configured as a bidirectional transceiver or a receiver.

Dual buffered outputs — When the FOX 3G HD-SDI is configured as a transmitter, the SDI/HD-SDI BNC output connectors can be used for previewing the video on a local monitor.

Input equalization and reclocking on buffered outputs — The FOX 3G HD-SDI automatically equalizes incoming multi-rate SDI signals, and reshapes and restores signals on its buffered outputs.

Daisy chain capability — Up to 10 transceivers can be daisy chained to send the video to multiple locations when one of more units are configured as receivers.

Real-time status LED indicators for troubleshooting and monitoring

1-inch high, quarter rack width, metal enclosures — With low profile enclosures, the transceiver can be discreetly installed in various locations, such as behind a plasma or LCD flat-panel display.

Rack mountable — The unit is rack mountable in any conventional 19-inch wide rack, using any of a variety of Extron rack shelves.

Power — The 100 VAC to 240 VAC external power supply provides worldwide power compatibility.

Installation and Operation

This sections details the installation of the FOX 3G HD-SDI, including:

- **Installation Overview**
- **Mounting the Transceiver**
- **Connections and Settings**
- **Operation**

Installation Overview

Follow these steps to install and set up an Extron FOX 3G HD-SDI for operation:

1. Turn off all of the equipment. Ensure that the video sources and the output display are all turned off and disconnected from the power source.
2. Mount the transceivers. See **Mounting the Transceiver**.
3. Connect the cables and configure the transceivers. See **Connections and Settings**.
4. Plug in the power supplies, then turn on the display devices and the input devices.

Mounting the Transceiver

CAUTION: Installation and service must be performed by authorized personnel only.

Detailed mounting instructions can be found in the **Reference Information** section. The 1 inch high, quarter-rack width FOX 3G HD-SDI transceiver can be placed on a tabletop, **mounted on a rack shelf**, **mounted under a desk or tabletop**, or **mounted on a projector bracket**. Use the applicable optional hardware:

- RSF 123 3-inch deep rack shelf kit (part #60-190-20)
- RSB 123 3-inch deep rack shelf (part #60-604-21)
- RSU 126 6-inch deep universal rack shelf kit (part #60-190-10)
- RSB 126 6-inch deep basic rack shelf (part #60-604-11)
- RSU 129 9.5-inch deep universal rack shelf kit (part #60-190-01)
- RSB 129 9.5-inch deep basic rack shelf (part #60-604-02)
- MBU 125 Under-desk mount kit (part #70-077-01)
- MBD 129 Through-desk mount kit (part #70-077-02)
- PMK 300 pole mount kit (part #70-374-01)
- PMK 350 low profile multi-product pole mount kit (part #70-563-02, -03)

Connections and Settings

All connectors are on the rear panel (figure 4).

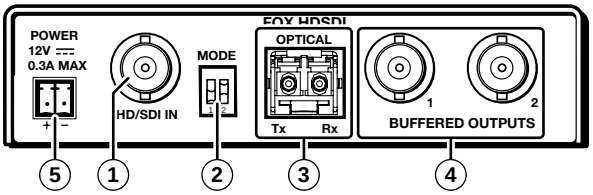
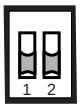


Figure 4. FOX 3G HD-SDI Transceiver Connectors

① **HD-SDI Input connector — If the FOX 3G HD-SDI is configured as either a bidirectional transceiver or as a transmitter**, connect an HD-SDI, SDI, or 3G-SDI video input to this BNC connector.

② **Mode switches —** Set these DIP switches to the positions shown in the table below to select the transceiver configuration. See **Transceiver Configurations** on page 2 for more information.

MODE



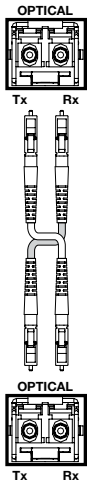
SW1	SW2	Mode
Down	Down	Bidirectional transceiver (**default position**)
Down	Up	Transmitter with local monitor outputs
Up	Down	Receiver with daisy chaining
Up	Up	Spare (functions as receiver with daisy chaining)

③ **Fiber optic connectors —**

WARNING: This unit outputs continuous invisible light, which may be harmful to the eyes; use with caution. For additional safety, plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.

NOTE: Ensure that you use the proper fiber cable for your transceivers. Typically, singlemode fiber cable has a yellow jacket and multimode fiber cable has an orange or aqua jacket. Also, see **Fiber Compatibility Indications** on page 9 to determine the compatibility of the transceiver.

Tx — In any FOX 3G HD-SDI configuration, for all one-way HD-SDI, SDI, or 3G-SDI transmission, connect a fiber optic cable to the Optical Tx LC connector.



Connect the free end of this fiber optic cable to the Optical Rx LC connector on another FOX 3G HD-SDI transceiver that is configured as either a bidirectional transceiver or a receiver.

Rx — If the FOX 3G HD-SDI is configured as a bidirectional transceiver or as a receiver, for one-way communications from the transmitting unit, connect a fiber optic cable to the Optical Rx LC connector. Connect the free end as detailed below:

In a 2-transceiver system, connect the free end of this fiber optic cable to the Optical Tx LC connector on the transmitting FOX 3G HD-SDI, which is configured as a transmitter.

In a daisy-chained system, connect the free end of this fiber optic cable to the Optical Tx LC connector on the previous FOX 3G HD-SDI in the daisy chain.

④ **Buffered Outputs connectors — In any FOX 3G HD-SDI configuration**, connect a digital display to these BNC connectors. See **Transceiver Configurations** for more details.

If the FOX 3G HD-SDI is configured as a bidirectional transceiver, the video is output on both connectors 1 and 2 and is the video signal sent from the other transceiver.

If the FOX 3G HD-SDI is configured as a receiver, the video is output on connector 2 only and is the video sent by the transmitting unit.

If the FOX 3G HD-SDI is configured as a transmitter, the video is output on both connectors 1 and 2 and is looped through from the HD/SDI Input connector, **item ①**, on the same transceiver.

⑤ **Power connector —** Plug the included external 12 VDC power supply into this 2-pole captive screw connector. Figure 5 shows how to wire the power connector. Use the supplied tie-wrap to strap the power cord to the extended tail of the connector.

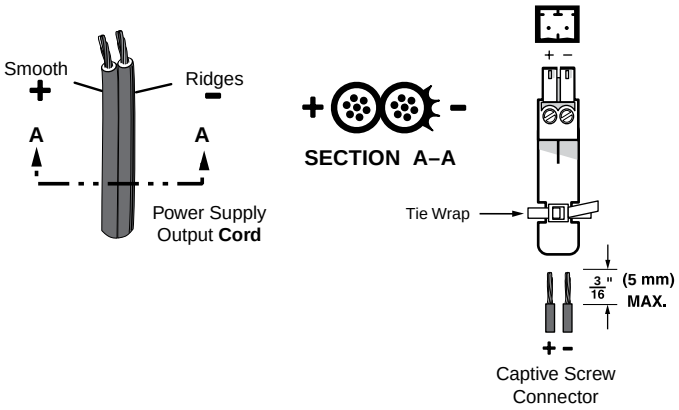


Figure 5. Power Connector Wiring

CAUTION: The length of the exposed (stripped) copper wires is important. **The ideal length is 3/16 inch (5 mm)**.

- Longer bare wires can short together.
- Shorter wires are not as secure in the connectors and could be pulled out.

NOTE: Do not tin the power supply leads before installing them in the direct insertion connector. Tinned wires are not as secure in the connectors and could be pulled out.

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

WARNING: The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

Alternatively, an optional Extron PS 123 Universal 12 VDC Power Supply, part #**60-814-01**, can power multiple Extron 12 VDC devices using only one AC power connector.

CAUTIONS: This product is intended to be supplied by a Listed Power Unit marked "Class 2" or "LPS," rated 12 VDC, 1.0 A minimum. Always use a power supply supplied by or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.

Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 75 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to a building structure or similar structure.

Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the unit. The ridges on the side of the cord (figure 5) identify the power cord negative lead.

Operation

After the transmitting and receiving units and all of their connected devices are powered up, the system is fully operational. If any problems are encountered, ensure all traditional and fiber cables are routed and connected properly.

Front Panel Indicators

All indicators are on the front panel (figure 6).

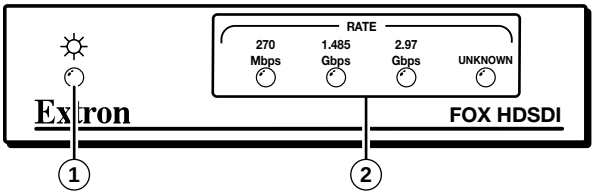


Figure 6. FOX 3G HD-SDI transceiver indicators

① **Power indicator —** When lit, this light emitting diode (LED) indicates that the FOX 3G HD-SDI transceiver is receiving power.

② **Rate indicators —** These LEDs light to indicate the detected input video rate, either on the HD/SDI input BNC (if configured as a transmitter) or on the Optical Rx connector (if configured as a receiver or bidirectional transceiver). The recognized rates are 270 Mbps, 1.485 Gbps, or 2.97 Gbps.

When the Rate Unknown LED lights, this indicates that an input is detected, either on the HD/SDI input BNC (if configured as a transmitter) or on the Optical Rx connector (if configured as a receiver or bidirectional transceiver), but that the FOX 3G HD-SDI does not recognize the rate.

NOTES:
- All four Rate LEDs blink repeatedly if a fiber optic connector module on the rear of the unit is unseated.
- The FOX 3G HD-SDI equalizes and distributes the input whether it recognizes the rate or not.

Fiber Compatibility Indications

You must use the proper fiber cable for your transceivers. Each transceiver indicates its fiber compatibility, singlemode or multimode, at power-up by blinking the four Rate indicators.

- **Multimode —** The Rate LEDs blink once.
- **Singlemode —** The Rate LEDs blink twice.

NOTES:
- To determine the fiber cable type, observe the cable jacket. Typically, singlemode fiber cable has a yellow jacket and multimode fiber cable has an orange or aqua jacket.
- All transceivers in the system ***must*** be the same model (all singlemode or all multimode). Mixed transmission mode units ***will not work together***.

Reference Information

This section discusses the specifications, part numbers, and accessories for the FOX 3G HD-SDI. Topics that are covered, include:

- **Specifications**
- **Part Numbers**
- **Mounting the Transceiver**

Specifications

NOTES:
- The FOX 3G HD-SDI is a transceiver that can function as a transmitter and/or as a receiver. Two units are required for a transmitter-receiver system with one fiber optic cable linking the two units. The FOX 3G HD-SDI is available in singlemode or multimode versions.
- These transceivers are class 1 laser products. They meet the safety regulations of IEC-60825, FDA 21, CFR 1040.10, and FDA 21 CFR 1040.11.
- The FOX 3G HD-SDI P SM transceivers offer immunity to "pathological" signals, including test patterns defined by SMPTE Recommended Practice (RP) 178 and SMPTE RP 198 for SD-SDI, HD-SDI, and 3G-SDI.
- FOX 3G HD-SDI P SM transcievers are immune to pathological signals only when P model units are used for both transmitter and receiver with no other equipment between the two units. If the signal is routed through a Fiber Matrix, FOX 4G DA8, or FOX 4G SW8, the system does not provide immunity.

Optical fiber interconnection between transmitter and receiver

Number/type ..... 1 fiber optic

NOTE: Only one fiber is required to transmit video and embedded audio and unidirectional data.

Connectors ..... 1 LC connector

Operating distance

Singlemode ..... 30 km (18.75 miles) with singlemode (SM) cables with a FOX 3G HD-SDI SM

Multimode ..... 500 m (1640') with 62.5 µm multimode (MM) cables with a FOX 3G HD-SDI MM
1 km (3280') with 50 µm multimode (MM) cables with a FOX 3G HD-SDI MM
2 km (6561') with 50 µm 2000 MHz bandwidth laser optimized multimode (MM) cables with a FOX 3G HD-SDI MM

NOTE: Operating distance is approximate. These are typical maximum distances that may vary depending on factors such as fiber type, fiber bandwidth, connector splicing, losses, modal or chromatic dispersion, environmental factors, and kinks.

Nominal peak wavelength 850 nm for FOX 3G HD-SDI MM; 1310 nm for FOX 3G HD-SDI SM

Transmission power

Singlemode ..... -5 dBm, typical

Multimode ..... -5 dBm, typical

Maximum receiver sensitivity
- Singlemode ..... -18 dBm, typical
- Multimode ..... -12 dBm, typical

Optical loss budget
- Singlemode ..... 13 dB, maximum
- Multimode ..... 7 dB, maximum

Video

- Signal type ..... HD-SDI, SDI, and 3G-SDI digital video signals
- Gain ..... Unity
- Resolution ..... 8 or 10 bits, automatic
- Data rates ..... 270 Mbps, 1.485 Gbps, 2.970 Gbps
- Operation standards ..... SMPTE 259M-C, SMPTE 292M, SMPTE 424M, ITU-R BT.601, ITU-R BT.1120
- Auto data rate lock ..... Yes

Video input— transmitter

- Number/signal type ..... 1 single link SDI, HD-SDI, or 3G-SDI digital component video
- Connectors ..... 1 female BNC
- Data rates ..... 19 Mbps to 2.97 Gbps
- Nominal level ..... 0.8 Vp-p
- Minimum/maximum levels ..... 0.5 V to 1 Vp-p with no offset
- Impedance ..... 75 ohms
- Return loss ..... ≥15 dB @ 5 MHz to 1.5 GHz
≥10 dB @ 1.5 GHz to 3 GHz
- DC offset (max. allowable) ..... 5 V
- Input coupling ..... AC
- Input cable equalization ..... Automatic for up to -30 dB of cable loss
  - HD-SDI ..... 120 m (400') using Extron RG6 cable
90 m (300') using Extron RG59 cable
  - SDI ..... 150 m (500') using Extron RG6 cable
120 m (400') using Extron RG59 cable

NOTE: The transmission distance varies depending on the signal resolution and on the type of cable, graphic card, and display used in the system.

Video output— receiver

- Number/signal type ..... 2 single link SDI, HD-SDI, or 3G-SDI digital component video
- Connectors ..... 2 female BNC
- Re-clocking ..... Automatic for 270 Mbps, 1.485 Gbps, 2.97 Gbps, or bypassed for unrecognized rates
- Nominal level ..... 0.8 Vp-p
- Minimum/maximum levels ..... 0.5 V to 1.0 Vp-p
- Impedance ..... 75 ohms
- Return loss ..... <-25 dB @ 100 MHz
- DC offset ..... ±5 mV with input at 0 offset

General

- External power supply ..... 100 VAC to 240 VAC, 50-60 Hz, 6 watts, external; to 12 VDC, 1 A, regulated
- Power input requirements ..... 12 VDC, 0.3 A
- Temperature/humidity ..... Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing
Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
- Cooling ..... Convection, no vents
- Mounting
  - Rack mount ..... Yes, with optional rack shelf kit
  - Furniture mount ..... Yes with optional through-desk or under-desk mounting kit
  - Pole mount ..... Yes, with optional pole mounting kit
- Enclosure type ..... Metal

Enclosure dimensions	1.0" H x 4.3" W x 3.0" D (quarter rack wide) (2.5 cm H x 10.9 cm W x 7.6 cm D) (Depth excludes connectors.)
Product weight	0.5 lb (0.3 kg) per each unit
Shipping weight	3 lbs (2 kg) per each unit
Vibration	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliance	
Safety	CE, c-UL, FDA Class 1, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE: All nominal levels are at ±10%.
NOTE: Specifications are subject to change without notice.

Part Numbers

FOX 3G HD-SDI Part Numbers

NOTE: The FOX 3G HD-SDI is a transceiver that can function as a transmitter and/or as a receiver. At least two units are required for a transmitter-receiver system with one fiber optic cable linking the two units.
Additional transceivers configured as receivers can be added to the system for daisy-chaining.

The FOX 3G HD-SDI is available in singlemode (SM) and multimode (MM) models:

FOX 3G HD-SDI Transceiver	Part number
FOX 3G HD-SDI P SM	60-1056-02
FOX 3G HD-SDI SM	60-901-01
FOX 3G HD-SDI MM	60-900-01

These items are included in each order for a FOX 3G HD-SDI transceiver:

Included part	Part number
12 VDC power supply	70-055-01
Tweeker (small screwdriver)	
Setup guide	
(1) 10' LC-LC duplex patch cable (SM or MM, depending on the model)	

Mounting Accessories

Mounting Kit	Part Number
RSF 123 3-inch deep 1U rack shelf kit	60-190-20
RSB 123 3-inch deep 1U rack shelf	60-604-21
RSU 126 6-inch deep 1U universal rack shelf kit	60-190-10
RSB 126 6-inch deep 1U basic rack shelf	60-604-11
RSU 129 9.5-inch deep 1U universal rack shelf kit	60-190-01
RSB 129 9.5-inch deep 1U basic rack shelf	60-604-02
MBU 125 under-desk mount kit	70-077-01
MBD 129 through-desk mount kit	70-077-02
PMK 300 projector mount kit	70-374-03
PMK 350 low profile projector mount kit (black, white)	70-563-02, 03

Accessories

These items can be ordered separately:

Accessory	Part number
RG59 non-plenum cable	22-145-*xx*
RG59 plenum cable	22-146-*xx*
RG6 BNC cable	26-383-xx

Mounting the Transceiver

CAUTION: Installation and service must be performed by authorized personnel only.

The 1-inch high, quarter rack width FOX 3G HD-SDI can be placed on a tabletop, mounted on a rack shelf, or mounted under a desk or tabletop. The receiver can be mounted on a projector bracket.

Tabletop Use

Affix the four included rubber feet to the bottom of the unit and place it in any convenient location.

Rack Shelf Mounting

For rack mounting, mount the transceiver using any of the following rack mounting options:

- RSF 123 3-inch deep rack shelf kit (part #60-190-20). See **figure 7**.
- RSB 123 3-inch deep rack shelf (part #60-604-21)
- RSU 126 6-inch deep universal rack shelf kit (part #60-190-10)
- RSB 126 6-inch deep basic rack shelf (part #60-604-11)
- RSU 129 9.5-inch deep universal rack shelf kit (part #60-190-01. See **figure 8**.
- RSB 129 9.5-inch deep basic rack shelf (part #60-604-02)

UL Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines pertain to the installation of a FOX 3G HD-SDI unit into a rack.

1. **Elevated operating ambient —** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature specified by the manufacturer [Tma = +32 to +122 °F (0 to +50 °C)].
2. **Reduced air flow —** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading —** Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading —** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding) —** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Rack shelf mounting instructions

On the 6-inch and 9.5-inch rack shelves, the transceiver unit can be mounted in the front or the rear of the rack.

1. Remove the feet from the bottom of the transceiver unit if installed.
2. Mount the transceiver unit on the rack shelf, using two 4-40 x 3/16-inch screws in opposite (diagonal) corners to secure it to the shelf (figure 7).

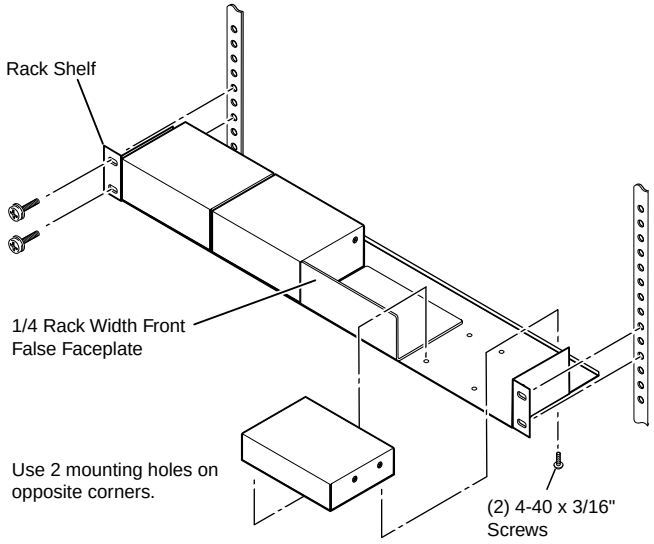


Figure 7. Mounting the Unit on a 3-inch Rack Shelf

3. Install blank faceplate(s) or other unit(s) on the rack shelf.
4. Attach the rack shelf to the rack using the supplied bolts.

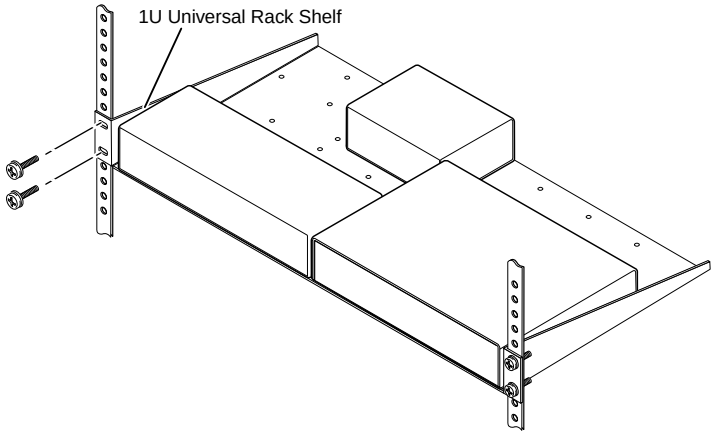


Figure 8. Mounting the Unit on a Universal Rack Shelf

Furniture Mounting

Under-Furniture Mounting

The unit can be mounted under a horizontal surface using an optional MBU 125 under-desk mounting kit (part #70-077-01). Mount the unit under a desk or table as follows:

1. Remove feet from the bottom of the FOX 3G HD-SDI unit if installed.
2. Secure the under-desk mounting brackets to the transceiver with the four machine screws provided in the mounting kit (figure 9).

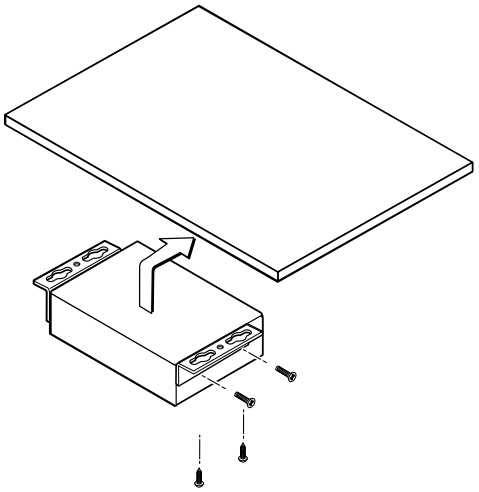


Figure 9. Under-desk Mounting

3. Hold the transceiver with attached brackets against the underside of the desk or other furniture. Mark the location of holes for screws on the desk.
4. Drill 1/4-inch (6.4 mm) deep, 3/32-inch (2 mm) diameter pilot holes in the table or desk at the marked screw locations from the underside or inside (the concealed side) of the furniture, where the transceiver will be located.
5. Insert the four wood screws into the pilot holes. Fasten each screw into the installation surface until just less than 1/4 inch of the screw head protrudes.
6. Align the installed screws with the slots in the mounting brackets, and place the transceiver against the surface, with the screws through the bracket slots.
7. Slide the transceiver slightly forward or back, then tighten all four screws to fasten it in place.

Through-furniture mounting

The transceiver can be mounted through a desk or other furniture using an optional MBD 129 through-desk mounting kit, part #70-077-02. Mount the transceiver through a desk or table as follows (figure 10):

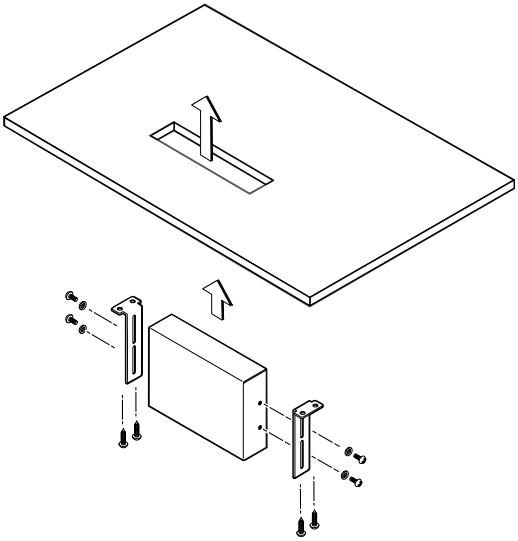


Figure 10. Through-desk Mounting

1. Loosely attach the mounting brackets to the transceiver using the four machine screws and washers supplied with the mounting kit.
2. Hold the transceiver against the inside of the surface through which it will be mounted. Mark the four screw holes and the table material to be removed on the inside of the surface to which you are mounting the device.
3. Remove the table material. Test the fit by inserting the front of the device through the hole. If necessary, use a rasp or coarse file to enlarge the hole.
4. Drill four pilot holes, each 3/32 inch in diameter by 1/4 inch deep, where you made marks.
5. Using the provided four wood screws, secure the brackets to the mounting surface.
6. Slide the transceiver up and down in the mounting brackets until the face of the transceiver is at the desired height. Tighten the screws that secure the brackets in place.

   If the screws are inaccessible to a screwdriver:

   a. Mark the location of the brackets relative to the screws.
   b. Remove the transceiver from inside the furniture.
   c. Tighten the screws.
   d. Replace the unit inside the surface (step **5**).

Projector Mounting

The transceiver can be mounted on a projector bracket using either of the following optional Extron projector mounting kits:

- PMK 300 multi-product pole mount kit (part #70-374-01)
- PMK 350 low profile, multi-product pole mount kit (part #70-563-02 [black] or part #70-563-03 [white])

PMK 300 mounting

Mount the transceiver to a PMK 300 bracket as follows:

1. If necessary, remove the feet from the bottom of the transceiver.
2. Mount the transceiver to one of the three mounting plates on the bracket using two of the supplied 4-40 x 3/16-inch screws in opposite (diagonal) corners to secure the device to the bracket. It can be vertically mounted facing either up or down (figure 11).

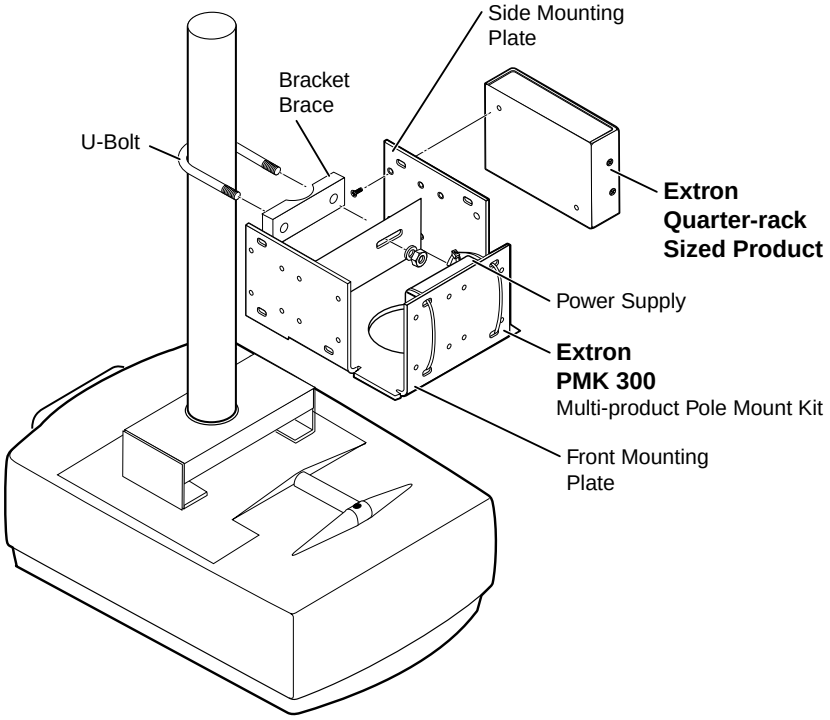


Figure 11. PMK 300 Projector Mounting a Transceiver

NOTE: On the side mounting plates, the device is typically mounted on the outside of the bracket.
On the front mounting plate, the device is typically mounted on the inside of the bracket.

3. **If the power supply is connected to the transceiver**, use the two included tie wraps to strap the power supply to one of the brackets.

> **NOTE:** The PMK 300 has a hole in the bottom plate that allows the projector pole to be inserted through the center of the plate (figure 12, below), rather than outside of the plate (**figure 11**). To install the PMK 300 in this configuration, slide the bracket up from the bottom of the pole before the projector is installed on the pole.

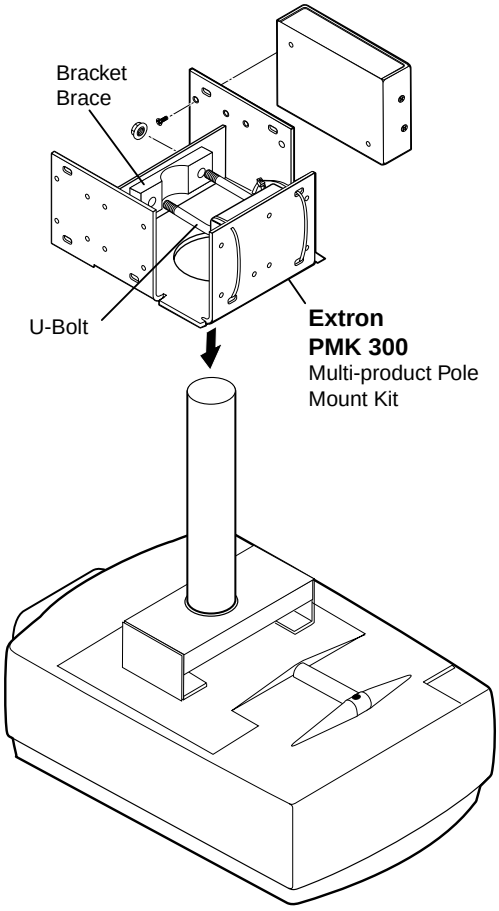


Figure 12. Projector Pole on the Inside

4. Place the contoured bracket brace against the pole and opposite the back plate. The pole should fit snugly into the depression in the center of the bracket brace.
5. Place the U-bolt around the ceiling pole. Insert the two legs of the U-bolt through the round holes on the contoured bracket brace and then through the slotted holes on the mounting plate of the bracket.

> **NOTE:** The supplied U-bolt fits a typical (1.5 inch to 2.0 inch diameter) ceiling pole.

PMK 350 mounting

Mount the transceiver to a PMK 350 bracket as follows:

1. Remove the front and rear plates from the PMK 350 (figure 13), using a Tweeker or a #2 Phillips screwdriver. Retain the screws to reattach the plates when you are finished.

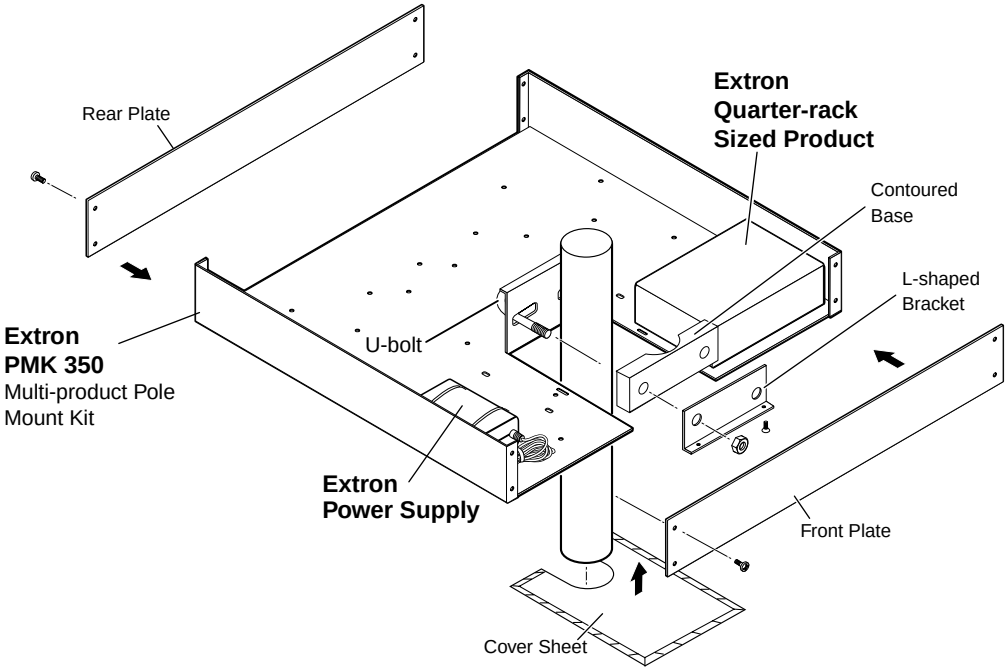


Figure 13. PMK 350 Projector Mounting a Transceiver

2. If necessary, remove the feet from the bottom of the transceiver.
3. Secure the transceiver to one side of the mounting tray, using two of the supplied 4-40 x 3/16-inch screws in opposite (diagonal) corners.
4. If power supply is connected to the transceiver, use the two included tie wraps to strap the power supply to the bracket.
5. Place the PMK 350 around the projector ceiling mounting pole (figure 13).

6. Assemble the U-bolt and the following parts in the following order (figure 14):
   a. Pass the legs of the U-bolt through the slotted holes on the mount plate flange.
   b. Place the legs around the projector pole.
   c. Pass the legs through the holes in the contour base.

      NOTE: The pole fits snugly into the depression in the center of the contoured base.

   d. Pass the legs through the holes in the L-shaped bracket.

      NOTE: The supplied U-bolt fits a typical (1.5-inch to 2.0-inch diameter) ceiling pole.

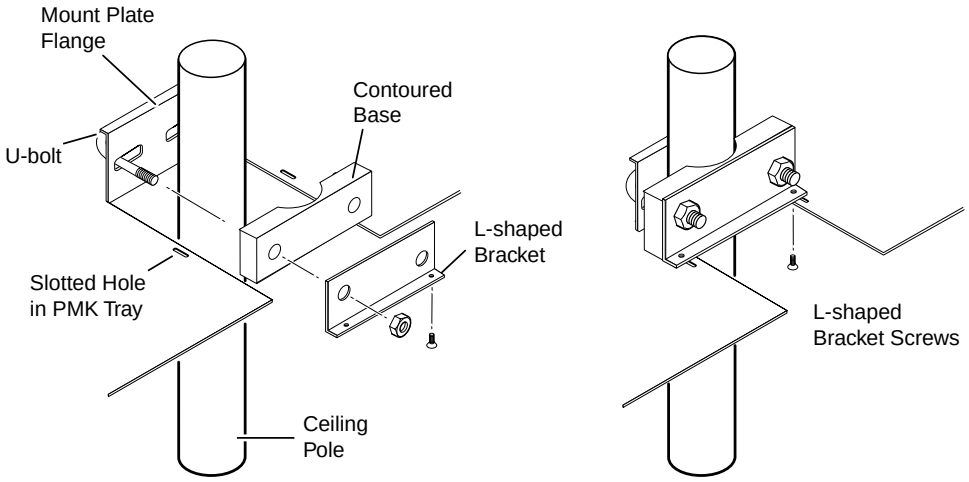


Figure 14. Hanging the Tray on the Pole

7. Align the two slotted holes in the bottom of the L-shaped bracket with the two slotted holes in the base of the tray. Secure the L-shaped bracket to the base by inserting two provided 6-32 x 5/16-inch screws through the aligned slots.
8. Move the PMK 350 up to the desired location on the ceiling pole, as close to the ceiling as desired.
9. Secure the L-shaped bracket to the U-bolt using the included hex nuts, washers, and lock washers. Tighten the hex nuts securely.

   NOTE: Be sure to tighten the hex nuts securely enough so that the PMK 350 does not slide down the ceiling pole. A socket wrench is recommended to tighten the hex nuts.

10. Secure the front and rear plates to the mounting tray with four of the included #6 screws.
11. If desired for aesthetics, choose one of the provided four sizes of self-adhesive cover sheets that most closely resembles the surrounding ceiling material, and apply it to the underside of the mounting tray.

Extron® Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe, Africa, and the Middle East:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:
Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: (714) 491-1500 **Europe**: 31.33.453.4040
Asia: 65.6383.4400 **Japan**: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron **USA - West** Headquarters	Extron **USA - East**	Extron **Europe**	Extron **Asia**	Extron **Japan**	Extron **China**	Extron **Middle East**
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+1.714.491.1500 **+1.714.491.1517** FAX	**+1.919.863.1794** **+1.919.863.1797** FAX	**+31.33.453.4040** **+31.33.453.4050** FAX	**+65.6383.4400** **+65.6383.4664** FAX	**+81.3.3511.7656** FAX	**+86.21.3760.1568** **+86.21.3760.1566** FAX	**+971.4.2991880** FAX

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